

tent, but of the plan by which it was preserved we have only obscure hints. Next to these we should probably place the Chipe-way pictography, as preserved on their *meda* sticks, bark records, and *adjiljiatig* or grave-posts. I have examined a number of specimens of these, but have failed to find any evidence that the characters refer to sounds in the language; however, I should not consider it improbable that further researches should disclose some germs of the ikonomatic method of writing even in these primitive examples of the desire of the human intellect to perpetuate its acquisitions, and hand them down to generations yet unborn.

Synonymic List of the North American species of Bufo and Rana, with descriptions of some new species of Batrachia, from specimens in the National Museum. By E. D. Cope.

(Read before the American Philosophical Society, October 1, 1886.)

BUFO Laur.

BUFO PUNCTATUS Baird & Girard, Proceedings Academy Philadelphia, 1852, p. 173. *Bufo beldingii* Yarrow, Proceedings U. S. National Museum, 1882, p. 441.

Sonoran and Lower Californian regions.

BUFO DEBILIS Girard, Proceedings Acad. Philadelphia 1854, p. 87.

Bufo insidiosus Girard, Proceedings Academy Philadelphia, 1854, p. 88.
Sonoran region.

BUFO COLUMBIENSIS Baird & Girard, Proc. Ac. Phila., 1853, p. 378. *Bufo*

boreas Baird & Girard, Proc. Ac. Phila., 1852, p. 174. *Bufo halophila* Baird & Girard, Proc. Ac. Phila., 1853, p. 301. *Bufo chilensis*, part, Günth., Cat. Batr. Sal. Brit. Mus., 1868, p. 57. *Bufo microscaphus* Cope, Proc. Ac. Phila., 1866, p. 301. *Bufo pictus* Cope, Report U. S. G. G. Expl. W. of 100th Mer., v, p. 522, pl. xxv, f. 4-5.

Pacific region; Western Central region.

BUFO COMPACTILIS Wiegman, Isis, 1833, p. 661. *Anaxyrus melancholicus*

Tschudi, Faun. Per. Herp., p. 78, pl. ii, f. 5. *Bufo speciosus* Girard, Proc. Ac. Phila., 1854, p. 86. *Bufo anomalus* Günth., Cat. Batr. Salien. Brit. Mus., 1868, p. 57. *Bufo levifrons* Bocourt, Bull. Soc. Philom. (7), i, p. 187. *Dromoplectrus anomalus* Camerano, Atti. Acc. Tor., xiv, p. 882.

Mexican district; Texas.

BUFO ALVARIUS Girard, Baird's Reptilia, U. S. Mexican Boundary Survey.

ii, p. 26, pl. xli, f. 1-6.

Colorado Desert.

BUFO HEMIOPHRYS Cope.

Superciliary crests not distinct on the muzzle, parallel, nearly straight, terminating abruptly posteriorly in a transverse elevation. The latter meet on the middle line, forming a transverse ridge, with an abrupt descent to the nape. Externally they extend but a short distance, leaving no representatives of the postorbital ridges except a few tubercles in one or two of the specimens. A small supratympanic tuberosity. No pre-orbital ridge. Muzzle vertical at end, nostrils terminal. Membrum tympani a vertical oval, two-thirds the diameter of the eye. Parotoid gland a narrow oval. Dermal tubercles distinguished by their small size and prominence. They form several rows on the back and external face of the tibia. At all other points the skin is closely areolated, the areolæ frequently acutely prominent, especially on the superior face of the tibia and on the sides. The heel of the extended hind leg reaches to the posterior border of the orbit. The posterior foot is wider than in the *B. lentiginosus*, though not relatively shorter. The web is excavated to the line of the middle of the fourth (first) phalange. The metatarsal tubercles are especially large. The internal is very wide and prominent, and has an extensive acute edge; the external is much smaller, but it also has a free cutting edge, transverse to the length of the tarsus. The length of the head to the position of the postorbital crests, enters the total (to the vent) four and a half times.

The color is brown, marked on the back with a median yellowish line, and two or three rows of brown spots of medium size on each side of it. These spots have one or two tubercles for their center pieces, which are more reddish than the rest of the spot. There are two brown spots on the upper lip, and one below the tympanum. A large spot extends from below the parotoid gland to near the front of the humerus. Posterior to this, with a slight interval, there extends a longitudinal deep brown band, which extends, with interruptions, to the groin. Below this, on the sides, are other dark-brown bands, which form a more or less reticulate pattern. The limbs and posterior feet have dark-brown cross-bands, and there is a very coarse dark brown reticulation of brown or brownish yellow on the posterior face of the femur. The belly is more or less black-spotted; throat immaculate.

<i>Measurements (No. 11,927).</i>		M.
Length of head and body.....		.059
" " " to posterior edge of m. tympani.....		.015
Width " " at anterior " " .....		.023
Length of anterior limb .....		.034
" " " foot .....		.014
" " posterior limb .....		.068
" " tibia .....		.020
" " tarsus.....		.010
" " rest of foot .....		.025

Besides the peculiarities of the head crests, and metatarsal shovels, this

species differs from most of the other North American species in having no postorbital crests, and in having the belly spotted. From the *B. lentiginosus fowleri* it differs also in the development of the external metatarsal tubercle, and in the connection between the frontoparietal crests behind.

No. 11,927. Six specimens from the northern boundary of Montana. Collected by Dr. Elliott Coues.

BUFO COGNATUS Say, Long's Expedition to the Rocky Mountains, ii, 1823, p. 190. *Bufo dipternus* Cope, American Naturalist, xiii, p. 437. Eastern half of Central region.

BUFO LENTIGINOSUS Shaw, Zoölogy, 1803, iii, i, p. 173, tab. 2111. Eastern and Central regions.

B. L. FOWLERI Putnam, MSS. Cope Check List North American Batr. and Reptilia, 1875, p. 29 (name only). Canadian and Hudsonian districts of Eastern region.

B. L. WOODHOUSEI Girard. *Bufo woodhousei* Girard, Proc. Ac. Phila., 1854, p. 86; Baird, U. S. Pacific R. R. Reports, x, p. 44. pl. xxv, f. 1. *Bufo frontosus* Cope, Proc. Ac. Phila., 1866, p. 301; Rept. Expl. U. S. Surv. W. of 100th Mer., Capt. G. M. Wheeler, 1877, v, pp. 520, 627.

Central region.

B. L. AMERICANUS Lec., Cope Check List N. Amer. Rept. & Batr., 1875, p. 29. *Bufo americanus* (Leconte) Holbr., N. A. Herp., v, pl. 4; Dum. & Bibr., p. 695; Hallow, Proc. Ac. Phila., 1856, p. 251; Girard, U. S. Mex. Bound. Surv., ii, p. 25; Wied., Nova Acta, xxxii, p. 121. *Bufo copei* Yarrow & Henshaw, Rept. Batr. Expl. W. of 100th Mer., 1878, p. 4.

Eastern and Austroriparian regions.

B. L. LENTIGINOSUS Shaw, Cope Check List N. American Rept. & Batr., 1875, p. 29. *Bufo lentiginosus* Shaw, Zoöl., iii, p. 173; Gird., Proc. Ac. Phila., 1854, p. 86. *Chilophryne lentiginosa* Cope, Proc. Ac. Phila., 1863, p. 357. *Bufo musicus* Latr., Rept., ii, p. 127; Daud. Rain, p. 9, pl. 33, f. 3, and Rept., viii, p. 190; Merr. Teut., p. 185; Gravenh. Delic., p. 59.

Austroriparian region.

BUFO QUERCICUS Holbrook, North American Herpetology, v, p. 13, 1842, tab. iii. *Chilophryne dialopha* Cope, Pr. A. N. S. Phila., 1862, p. 341 (erroneous locality). *Bufo dialophus* Boulenger, Cat. Batr. Sal. Brit. Mus. ed., ii, 1882, p. 319.

Austroriparian region.

BUFO VALLICEPS Wiegman, Isis, 1833, p. 657. *Bufo granulatus* Baird & Girard, Proc. Ac. Phila., 1852, p. 173. *Bufo nebulifer* Girard, Proc. Ac. Phila., 1854, p. 87. *Chilophryne nebulifera* Cope, Proc. Ac. Phila., 1862, p. 357.

Texan district of Austroriparian region; Mexican region, etc.

RANA Linn.*

RANA HALECINA Daudin (Kalm), Hist. Nat. Rept., viii (1803), 122, 432.

Rana aquatica, Water Frog, Catesby, Carol., ii (1743), 70. *Rana pipiens* Gm., ed. L. Syst. Nat. (1788), 1052-28. *Rana utricularia* Harlan, Sillim. Journ., x (1825), 60. *Rana virginiana* Lam., Syn. Rept., p. 31. *Rana palustris* Guérin, Iconogr. Rept., pl. 26, f. 1. *Rana oxyrhyncha* Hallow, Proc. Acad. Phila. (1856), p. 142. *Rana berlandieri* Baird, U. S. Mex. Bound. Surv. Rept., p. 27, pl. 36, f. 7-10. *Rana lecontei* "B & G." Günther Cat. Bat. Sal. Brit. Mus. 1858, 15; Brocchi Miss. Sci. Mex. Rept., p. 14, pl. iv, f. 1. Boulenger Cat. Bat. Sal., B. M. 1882, p. 42; nec Baird et Girardii.† Nearectic realm, except Pacific region.

R. H. SPENOCEPHALA Cope. *R. oxyrhyncha* Hallow, Proc. Acad. Phila., 1856, p. 142, nec Sundevalii.
Austroriparian region.

R. H. HALECINA Kalm (Cope). *Rana berlandieri* Baird, l. c.
Eastern and Austroriparian regions.

R. H. BRACHYCEPHALA Cope. *R. h. berlandieri* Cope, Check List Batr. Rept. N. Am., p. 32, nec *Rana berlandieri* Baird. *Rana halecina* Boulenger, Cat. Batr. Brit. Mus. ed. ii, p. 41, nec Kalmii.
Central and Sonoran regions.

RANA AREOLATA Baird & Girard. Proceeds. Acad. Phila. 1852, p. 173; Baird, U. S. Mex. Bound. Surv., pl. 36, f. 11-12.
Austroriparian region, extending north in Mississippi valley.

R. A. AREOLATA Bd. & Gird. *Rana areolata* Baird & Girard, Proc. Acad. Phila., 1852, p. 173; Baird, U. S. Mex. Bound. Surv., pl. 36, f. 11, 12.
Austroriparian region.

R. A. AESOPUS Cope, s. sp. nov.
Florida.

Length of head two and a half times in the total; tympanic disk a vertical oval; dorsal spots well separated; nostril equidistant between end of muzzle and eye.

This singular form may be known at once by the short and squat form of the body as compared with the size of the head, resembling in this some of the Australian Cystignathidæ.

The muzzle is not prominent, and does not project beyond the upper lip. The canthus rostrales are straight, and the top of the head is flat. The tympanic disk is a vertical oval, of which the short diameter is one half the length of the eye. The edge of the vomerine patches of teeth

* The determination of the relations between the North American and European species of this genus have been greatly facilitated by the admirable researches of Boulenger.

† The Mexican specimens referred to in these citations constitute a subspecies, which I call *R. h. austricola*.

are a little posterior to the line connecting the posterior border of the nares. The latter are about as large as the ostia pharyngea.

The dorsolateral glandular ridge is thick and extends a little beyond the sacral diapophysis. There are six or seven rows of short longitudinal glandular tubercles in the space between them. There are similar elongate warts on the sides. The posterior and posteroinferior faces of the femora finely granular; rest of the inferior surfaces smooth.

The first finger is longer than the second and equals the fourth. The heel of the extended hind leg reaches to the middle of the eye. The foot is of moderate length. Three of the phalanges of the fourth digit are entirely free, and the web is excavated to opposite the middle of the first phalange, extending as a margin on each side of the distal half. The inner cuneiform tubercle is not large and has an acute apex; no external tubercle. A slightly defined tarsal dermal ridge.

In alcohol the ground color is light brown, with the dorsolateral ridge and the inferior surfaces straw-color. The spots are a dark brown, and do not appear to have been yellow bordered. The dorsal spots are irregularly rounded, and are in three or four longitudinal rows. There are two rows on the top of the muzzle and head, crossing the inner edge of the eyelid. There are two spots near the external edge of each eyelid. Spots on the sides smaller, in about four rows. The lores and upper lips are rather coarsely marbled with brown; gular region faintly speckled with the same. No band, but a spot on the front of the humerus; a spot on the elbow, and three cross lines on the fore arm. Four narrow cross lines on the femur, and five across the tibia. Three cross bars on the external face of the fifth toe. The posterior face of the femur has numerous rounded brown spots on a light ground.

Measurements (No. 4743).

M.

Length of head and body.....	.062
Width of head at posterior edges of tympana.....	.020
Length " to " " " " ".....	.024
Length of fore leg.....	.026
" " fore foot.....	.012
" " hind leg, to groin.....	.074
" " tibia.....	.024
" " tarsus.....	.013
" " rest of foot.....	.025

The only specimen of this subspecies which I have seen is the following: No. 4743, Micanopy, Fla. Dr. T. H. Bean.

R. A. CAPITO Leconte, Proc. Acad. Phila., 1855, p. 425.
Floridan district.

R. A. CIRCULOSA Rice & Davis. *Rana circulosa* Rice & Davis, in Jordan's Manual of Vertebrata of Eastern North America, ed. ii, p. 255.
North Central Eastern region. (Illinois.)

RANA PALUSTRIS Leconte. *R. palustris* Leconte, Ann. Lyc. N. Y., i, p. 282. *R. pardalis* Harlan, Amer. Journ., x, p. 50.

Eastern region.

RANA SEPTENTRIONALIS Baird, Proc. Acad. Phila., 1855, p. 51. *R. sinnata* Baird, l. c.

Eastern region, Canadian and Hudsonian districts.

RANA CLAMATA Daudin, Hist. Nat. Rept., viii (1803), 104-431. *R. clamitans* Daudin, in Sonn. & Lat. Hist. Nat. Rept., ii (1802), 157. *R. fontinalis* Leconte, Ann. N. Y. Lyc., i (1825), 282. *Ranaria melanota* Rafin, Annals of Nature (1820), No. 25. *Rana melanota* (Raf.) Harl., in Sill. Am. Jour. Sc., x (1825), 64. *Rana flavoviridis* Harl., in Sill. Am. Jour. Sc., x (1825), 58; *Rana horiconensis* Holbrook, N. A. Herp., 1st ed., iii (1838), 91. *Rana nigricans* Agassiz, L. Sup. (1850), 379, vi, f. 4, 5.

Eastern region.

RANA CATESBEIANA Shaw. *Rana catesbiana* Shaw, Gen. Zoöl., iii, Amphibia (1802), 106, pl. xxxiii. *Rana boans* Lacep, Hist. Nat. Nuad. Ovip. (1st ed., 1798), ed. Deteoville, i (1819), 270, 315. *Rana pipiens* Harl. (nec. Linnæus), Sill Am. Jour. Sc., x (1825), 62. *Rana mugiens* Merrem., Tentamen Syst. Amph. (1820), 175. *Rana scapularis* Harl., Sill. Am. Jour. Sc., x (1825), 59. *Rana maxima americana aquatica* Catesby, Carol., ii (1743), 72. *Rana couspersa* Leconte, Proc. Ac. Phila., 1855, p. 425.

Eastern region.

RANA TEMPORARIA Linn., Syst. Nat., ed. 12, p. 357, pars. *Rana muta* Laur, Syn. Rept., p. 30. *Rana temporaria* Schneider, Hist. Amph., p. 113. *Rana flaviventris* Millet, Faun. Maine et Loire, ii, p. 663. *Rana cruenta* Pallas, Zoögr. Ross.-As., p. 12. *Rana alpina* Risso, Hist. Nat. Eur. mér., iii, p. 93. *Rana scotica* Bell, l. c., p. 102. *Rana platyrrhinus* Steenstr., Amtl.-Ber., 24, Vers. Kiel, p. 131. *Rana fusca* De l'Isle, Ann. Sc. Nat., ser. 5, xvii, 1873. *Rana temporaria*, var. *platyrrhina* Schreib., Herp. Eur., p. 125. *Rana dybowskii* Günth., Ann. & Mag. N.H., 1876, xvii, p. 337; Catal. Bat. Sol. Brit. Mus., ed. i, p. 16. Europe, Northern and Temperate Asia.

R. T. PRETIOSA Bd. & Gird. *Rana pretiosa* Bd. & Gird., Proc. Ac. Phila., 1853, p. 378; Baird, Proc. Ac. Phila., 1855, p. 378; Gird., U. S. Expl. Surv., xii, part ii, p. 304; Boulenger, Bull. Soc. Zoöl. Fr., 1880, p. 208; Cope, Proc. Ac. Phila., 1883, pp. 20, 33; Am. Nat., 1879, p. 435.

Pacific region.

RANA CANTABRIDGENSIS Baird, Proc. Ac. Phila., 1854, p. 62. *Rana sylvatica* Dekay, N. Y. Fauna, iii, p. 64, pl. 21, 22. *Rana temporaria*, var. *sylvatica* pt. Günth., Cat. Brit. Mus., 1868, p. 17. *Rana temporaria cantabridgensis* Cope, Check. List. N. Amer. Batr. Rept. 1875, p. 32.

Canadian and Hudsonian districts of Eastern region.

R. C. LATIREMIS Cope.

This form looks very different from the true *Rana cantabrigdensis*. Muzzle rather obtuse, more so than in the typical *R. cantabrigdensis*, and widened posteriorly; its length at the posterior edge of the tympana entering the length of the head and body three and a half times. The tympanic drum is very distinct, and its long diameter enters that of the eye two-thirds of a time. The nostrils are equidistant between the orbit and the end of the muzzle, and look upwards. The skin is quite smooth everywhere, and the dorsolateral fold is easily obliterated by immersion in alcohol. The heel of the extended hind leg reaches to the middle of the eye; the second toe reaches nearly to the apex of the knee. The palmaria is remarkably wide, leaving but one free phalange and all the digits except the fourth, where two are free. The internal cuneiform tubercle is quite prominent, with an obtuse convex edge; there is no external tubercle. The internal finger (index) is short and stout, and is very little or not at all longer than the second (third) finger.

Color, above, light brownish-gray; below, white. There are more or less numerous black spots on the sides, which incline to fuse more or less imperfectly into a longitudinal band along the dorsolateral dermal fold. There are in some specimens a few small black marks on the back between the lateral folds. A dark line along the canthus rostralis. The black "ear patch" is reduced to a black line, which passes from the eye posterior to the tympanic disk, and ceases opposite the inferior border of the latter.

<i>Measurements (No. 13,723).</i>		M.
Length of head and body.....		.052
Width of head at posterior edge of tympana.....		.019
Length of " " " " " .....		.015
Length of fore limb.....		.022
" " " foot.....		.011
" " hind limb to groin.....		.071
" " tibia.....		.020
" " tarsus .....		.012
" " remainder of foot.....		.025

Four specimens from Lake Allokknagits, Alaska; obtained by C. L. McKay.

R. C. CANTABRIGDENSIS Baird.

Hudsonian district of Eastern region.

RANA AGILIS Thomas. *Rana temporaria*, var. *arvalis* part Günth., Cat., p. 16. *Rana temporaria* Millet, Faune Maine et Loire, ii, p. 664. *Rana agilis* Thomas, Ann. Sc. Nat., sér. 4, iv, p. 365, pl. 7. *Rana gracilis* Fatio, Rev. Mag. Zoöl., sér. 2, xiv, p. 81. *Rana temporaria*, var. *agilis* Schreb., Herp. Eur., p. 125.
Middle latitudes of Europe (Boulenger).

- R. A. AURORA Baird & Girard. *Rana aurora* B. & G., Proc. Ac. Phila., 1862, p. 174, and U. S. Explor. Exped., Herp., p. 18, pl. 11, f. 1-6. Washington and Oregon.
- RANA DRAYTONI Baird & Girard. *Rana draytoni* B. & G., Proc. Ac. Phila., 1862, p. 174; Girard, U. S. Explor. Exped., Herp., p. 23, pl. 11, f. 19-24. *Rana lecontei* Baird & Girard, Proc. Ac. Phila., 1853, p. 301; *Rana nigricans* Hallow, Proc. Ac. Phila., 1854, p. 96; Boulenger, Bull. Soc. Zoöl. Fr., 1880, p. 207; Brocchi, Miss. Sc. Mex. Batr., p. 15, pl. iv, f. 3. *Rana longipes* Hallow, U. S. Explor. Surv., x, 1859, iv, Zoöl., p. 20, pl. x, f. 1. *Epirhexis longipes* Yarrow, Check List and Catal. of Specimens of N. Amer. Rept. Batr., 1883, p. 176, not of Baird and Cope.
Pacific, and Western part of Central regions.
- R. D. DRAYTONI Baird & Girard.
California.
- R. D. ONCA Cope, in Yarrow's Rept. Expl. Surv. W. of 100th Mer. Zoöl., Vol. v, p. 528, pl. 25, f. 1-3.
Utah.
- RANA BOYLII Baird, Proc. Ac. Phila., 1855, p. 62.
California.
- RANA SILVATICA Lee. *Rana sylvatica* Lee, Ann. N. Y. Lyc., i (1825), 282.
Rana pennsylvanica Harlan, Sill. Am. Jour. Sc., x (1825), 58.
Eastern region.
- RANA PACHYDERMA Cope, Proc. Ac. Phila., 1883, p. 25.
Northern California and Southern Oregon.

URODELA.

PLETHODON CRASSULUS Cope, sp. nov.

This species has a superficial resemblance to the *P. oregonensis*, but its manifold differences are easily perceived.

The form is quite robust, and the head is large, its width going into the length to the thighs only five times. The tail is very much compressed from the base, and is also shallow; its length equals the distance from its base to the gular fold. The legs are robust, but not very long; when appressed to the side they fail to meet by the length of the posterior foot.

The tongue is large, filling the floor of the mouth. The vomeropalatine teeth are in two short series, which converge backwards without coming into contact, from behind the internal edge of the choanæ. The parasphenoid teeth are in a single, undivided patch, which commences well behind the vomeropalatines. The maxillary and mandibular teeth are minute.

The head, viewed from above, is oval; in profile the muzzle is thick and truncate, and projects beyond the mouth. The edge of the lip is slightly angulate below the nares. The eye is rather large, its length

equaling that of the muzzle. The distance between the nostrils is equal to that between the bases of the eyelids at their middles. The toes are short and free, one phalange of the first digit on each foot projecting. The ends of the toes are obtuse and bulbiform. A gular fold. Lateral folds fourteen.

<i>Measurements (No. 4947).</i>		<i>M.</i>
Total length .....		.0625
Length of head and body.....		.034
“ to groin .....		.0314
“ “ axilla.....		.0045
“ “ line of rictus oris.....		.006
“ “ “ eye.....		.0035
“ of fore leg.....		.0095
“ “ “ foot.....		.0032
“ “ hind leg.....		.0095
“ “ “ foot .....		.004
Width of head.....		.0077
“ between eyes.....		.0025

Color, above, uniform dark reddish-brown; below, uniform light brown.

I have seen but one specimen of this species, as follows :

<i>No.</i>	<i>No. of specimens.</i>	<i>Locality.</i>	<i>Collector.</i>
9447.	1.	California.	Dr. J. G. Cooper.

AMBLYSTOMA DECORTICATUM Cope, sp. nov.

This species has a good deal of affinity in its characters to the *A. parotikum* Baird, but it differs in important points of structure, as well as in its external appearance.

Its general proportions are not slender, and the limbs, especially the posterior ones, are very stout. The tail is long and is compressed from the base. It does not bear a fin at any part. Its length, in the single specimen before me, is equal to that of the head and body (including the vent), less the distance from the eye to the end of the muzzle. The head is short and the muzzle is contracted, and is steeply rounded in profile. The distance from the muzzle to the axilla enters the length from the axilla to the groin one and a half times. The width of the head enters the total length to the groin four times. The limbs when pressed to the side overlap by the length of the fingers.

There is no canthus rostralis, and the lower jaw does not project beyond the upper. The external nares are almost terminal, and are as far apart as the distance between the inner borders of the choanæ. The latter are rather large and are transverse. The vomeropalatine series of teeth form a short transverse band which is within the lines of the internal borders of the inner nares, and a considerable distance posterior to them. The tongue is wider than long, but does not fill the wide floor of the mouth laterally.

A dermal groove extends posteriorly from the eye to the side of the neck above the anterior border of the humerus. A branch groove descends a short distance posterior to the eye and turns forwards to the canthus of the mouth. These grooves divide masses of crypts, those on the inferior side of the groove being most prominent. The tract above the groove resembles the parotoid gland of the *Amblystoma paroticum*, but is much less distinctly defined, fading out upwards.

There are eleven well-defined lateral dermal folds, and space for a twelfth, which will probably be found well defined in other specimens. The back from the interscapular region posteriorly, and the superior part of the tail, are thickly studded with crypts. There is a slightly defined gular fold.

The fore limb is as long as from its anterior base to the anterior margin of the eye. The toes are quite short, and their lengths, beginning with the shortest, are 5-2-3-4. The posterior foot is especially robust, and the sole is wider than the length of the longest finger. There are no distinct tubercles on the sole. The lengths of the toes are, beginning with the shortest, 1-5-2-4-3.

<i>Measurements (No. 14,493).</i>		M.
Total length .....		.174
Length to base of tail.....		.090
“ “ groin .....		.071
“ “ axilla.....		.031
“ “ line of eyes .....		.005
“ of fore leg.....		.026
“ “ foot.....		.010
“ “ cubitus .....		.008
“ “ hind leg .....		.026
“ “ “ foot.....		.0105
Width between nostrils .....		.005
“ “ eyes.....		.006
“ of head .....		.016
“ “ sole .....		.008
Depth of tail at middle .....		.008

The manner of describing the color pattern of this species depends on what we regard as the ground. We can assume that the ground color is represented by a dark chocolate brown and say that this is closely studded with brownish white spots of irregular forms and sizes. On the back, limbs, and top and sides of the head, the pale spots are so close together as to reduce the brown to a net-work; on the fore legs the pale spots are larger than anywhere else. The spots are few on the tail, and those chiefly near the base. The inferior surfaces are dirty light brown.

The characters which separate this species from the *A. paroticum* are, the much shorter series of vomeropalatine teeth; the shorter fingers and toes; the less distinct parotoid glands; the shorter and more obtuse head, and the coloration.

It is the first and only species of *Amblystoma* yet found in Alaska.

No.	No. of specimens.	Locality.	Year.	Collector.
14,493.	1.	Port Simpson, Alaska.	1885.	T.H. Streets, U.S.N.

AMBLYSTOMA LEPTURUM Cope, s.p. nov.

This species resembles the *A. cingulatum*, but differs from it in the entirely different form and proportions of the tail. This part is very slender in the *A. lepturum*, with round or vertical oval section, without keel above, and lacking very little of being as long as the head and body together. The legs are of the same proportions as in the *A. cingulatum*; that is, when appressed they are separated by a space equal to the length of the posterior foot, showing their greatly superior length to those of the *A. microstomum*. The body is cylindric. The head is an oval, with produced and rounded muzzle, which projects beyond the lower jaw. The animal resembles a *Plethodon* rather than the species of *Amblystoma*, but its vomerine teeth and tongue have all the characters of the *Amblystoma microstomum*.

The vomerine teeth form a convex series extending forwards to a point between the choanae, where they are slightly interrupted on the middle line. The tongue is large, filling the floor of the mouth, and is extensively free at the sides only. The external nostrils are nearly terminal and are rather near together, the space between them being equal to just half that between the bases of the eyelids, and about three-fifths that between the choanae. The width between the eyes behind is equal to the axial length from the same to the end of the muzzle. The width of the head enters the length to the groin seven times. The length from the muzzle to the axilla enters the distance from the latter to the groin one and three-fifth times.

The lateral digits are distinct, and the median ones moderately elongate. Their lengths, beginning with the shortest, are, fore foot, 2-5-3-4; hind foot, 1-5-2-3-4. The phalanges are, fore foot, 2-2-3-2; hind foot, 2-2-3-4-2. No palmar or plantar tubercles.

The skin is perfectly smooth, and between the axilla and the groin it is marked by fourteen grooves. There are no dermal margins to the fingers or the tail. The cloacal orifice is a simple slit. There is a distinct post-gular fold.

Measurements (No. 14,583).					M.
Total length	.....	.....	.....	.....	.115
Length from end of muzzle to base of tail	.....	.....	.....	.....	.092
“ “ “ “ “ “ groin	.....	.....	.....	.....	.0515
“ “ “ “ “ “ axilla	.....	.....	.....	.....	.020
“ “ “ “ “ “ canthusoris	.....	.....	.....	.....	.0065
“ of fore leg	.....	.....	.....	.....	.013
“ “ “ foot	.....	.....	.....	.....	.0055
“ “ hind leg	.....	.....	.....	.....	.016
“ “ “ foot	.....	.....	.....	.....	.0075
Depth of tail at middle	.....	.....	.....	.....	.0025

The color of the typical specimen in alcohol is purplish brown above and paler below. There are numerous not well-defined whitish spots on the sides and a few on the belly, and there are some very faint and delicate gray lines across the posterior part of the back. The tail is densely speckled with gray on the sides, and delicate gray lines cross the upper surface of the tail in a reticulate manner. The limbs are paler than the back, and the digits are cross-banded with whitish.

The habitat of this species is unknown. The only specimen was found in a jar with a specimen of *Diemyctylus torosus*, and one of *Rana temporaria*, the former Californian, the latter Palearctic.

— AMBLYSTOMA ANNULATUM Cope, sp. nov.

The largest species of the group of the *A. microstomum*, and resembling that species rather than the *A. cingulatum*. However it approaches the last-named species in the form and length of its tail, but exceeds that and all the other species of Group V in the length of that part of the body.

The muzzle is very short, and the head is not distinguished from the neck. The legs are short, and when appressed to the sides are separated by a space of three and parts of two other intercostal spaces, equal to four spaces. The tail is in section cylindric at base, and widely oval to near the extremity, where it is more narrowly oval. It is not angulate and has no dermal margin on the middle line above or below. Its length exceeds that of the head and body by the length of the anterior foot, and it may have been longer, as the extremity is injured.

The head is short, and the width enters the length to the groin six and a quarter times. The front is convex to the upper lip, in profile, and transversely between the orbits. The parietal region is very convex transversely. The width between the canthi oculorum behind exceeds the length from the same point to the end of the muzzle. The nostrils present anteriorly, and they are not quite so close together as in *A. lepturum*, as the distance between them measures two-thirds the width between the eyelids. The vomerine teeth form two transverse fasciculi of several rows of teeth each, between the choanæ, convex forwards, and separated on the middle line by a very short interval.

The skin is perfectly smooth, there is a postgular fold, and the sides are crossed by thirteen folds with space enough at the axilla for a fourteenth. The tail is also very distinctly annulate-grooved. I count thirty-one grooves behind the femora, and the injured extremity is not grooved. Indistinct grooves are apparent on the tails of several of the species of *Amblystoma*. There are no rows of mucous pores on the head or body of this species, nor accumulations of crypts on the head, body or tail.

The palm is wide, and the fingers not long, though of unequal length. The lengths of the fingers, beginning with the shortest, are 2-5-3-4, and their phalanges number 2-2-3-2. The toes of the hinder foot have, in order of length, 1-5-2-3-4, and of phalanges, 2-2-3-4-2.

<i>Measurements (No. 11,564).</i>	<i>M.</i>
Total length .....	.186
Length to base of tail.....	.092
“ “ groin.....	.077
“ “ axilla.....	.022
“ “ canthus oris.....	.009
“ of fore limb, from axilla.....	.0172
“ “ “ foot.....	.007
“ “ hind limb, from groin.....	.022
“ “ “ foot.....	.012
Width of head .....	.012
Depth of tail at middle .....	.009

The typical and only specimen is preserved in alcohol. The color above, everywhere, is dark brown; below, very light brown. The sides are paler, perhaps pale yellow in life, and the color ascends at several points, so as to form cross-bands of moderate width and very well defined. One of them crosses at the occiput, and one at the axillæ; between the latter and the groin there are five, nearly equidistant. There is an imperfect one at the sacrum, and there are seven on the tail, one of them imperfect. The coloration of this species is quite unique in the genus in its regularity.

The locality of the only specimen is unknown.

NOTES.—I add here that the *Plethodon iëcanus* Cope proves to be a well-marked species of *Anaides*. The species was described from a young one. Also that a study of all the *Amphiumidæ* accessible to me, shows that the two and three-toed forms must be referred to a single species, the *A. means* Gard.

Is there Reciprocity in Trade? And the Consumption of Manufactured Commodities. By Thos. H. Dudley.

(Read before the American Philosophical Society, October 1, 1886.)

One of the chief arguments used by the free trader against the protective system in the United States, is that of reciprocity in trade. Indeed it may be regarded as one of the chief corner-stones upon which their free-trade theory is based.

Their formula is, that if I do not buy of you, you will not buy of me. And from it they argue that if the people of the United States continue their protective system and refuse to buy their manufactured commodities of England, the English people will refuse to buy anything of them.

The doctrine, when carried to its legitimate conclusion as they contend for it, is this: We are to repeal our protective laws, so as to enable the English to bring into our markets their manufactured commodities and sell to our people free of duty; and to this extent at least giving the English